



The Story Behind the Real Estate Cycle

Jackie Bai
Rosalyn Brown
Thomas Scott

Motivation & Summary

As a mortgage lender and Investor It Is key to understand trends to anticipate deteriorating loan quality and and how rates may Impact future loan volume and ongoing loan standards.

We are looking for trends that correlate to the change In rates as well as the most recent housing crisis. The analysis allowed us to see what trends mostly aligned with he most recent housing crisis to better allow us to adjust our lending criteria to stave off possible future losses as a lender.

Data Clean Up

The Data used needed to have the percentages removed and converted to strings to begin to utilize the data for comparison. Due to the large numbers used In the data many sets of Information needed to be scaled to best show correlation.





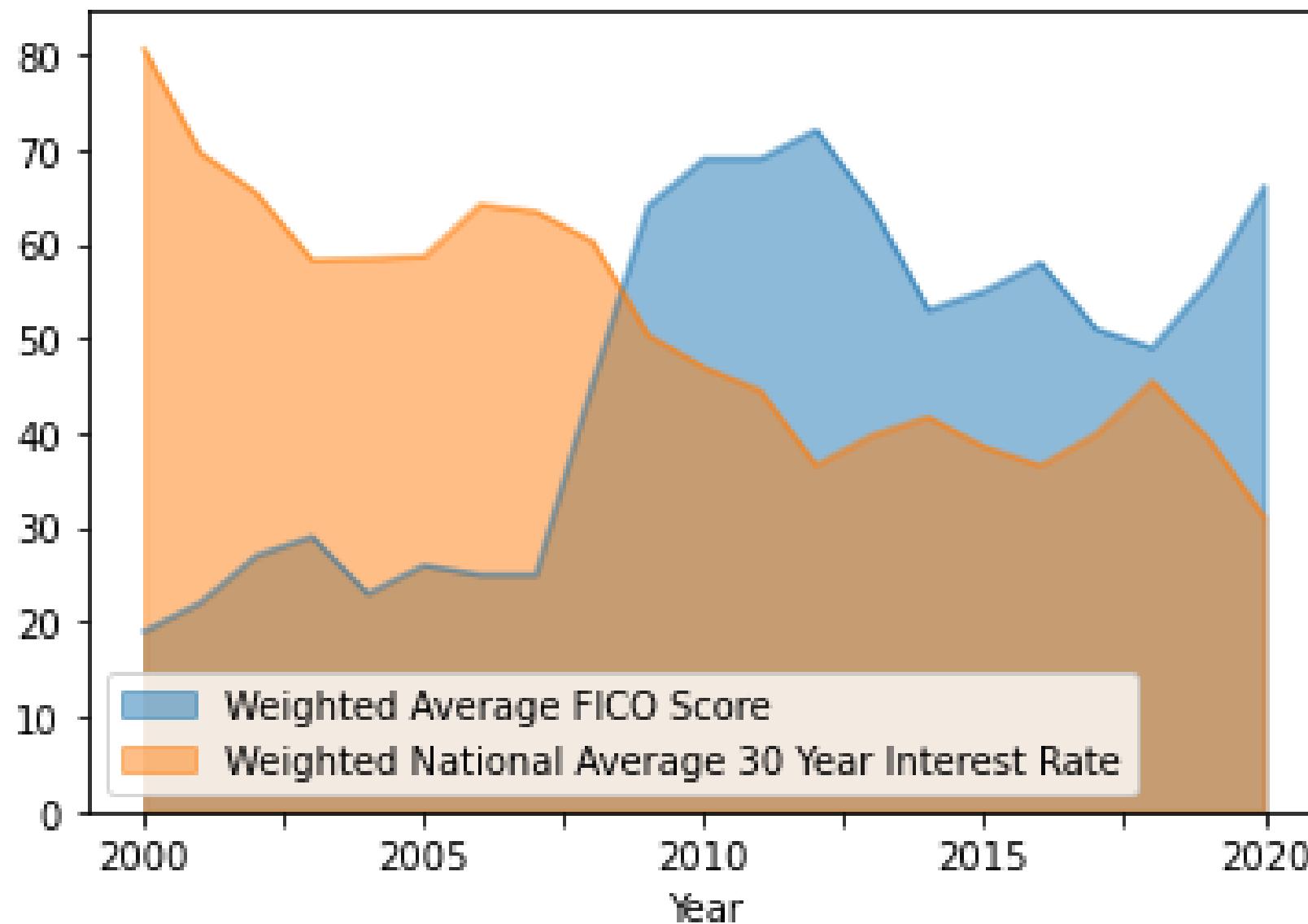
TREND 1

FICO Score

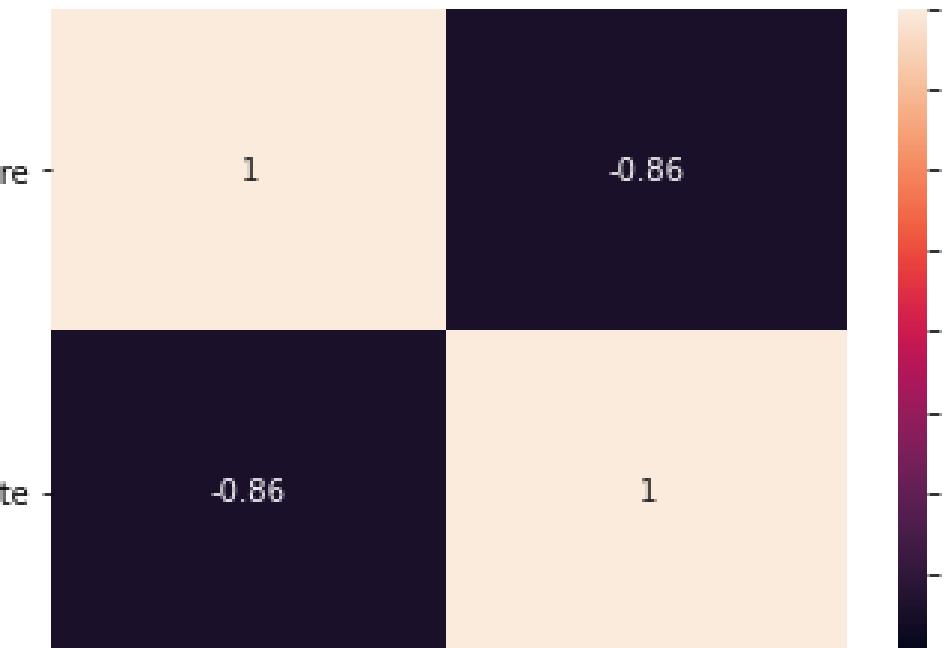
A numeric score used by organizations to determine the likelihood of a person to pay their obligations as they come due

#2 FICO SCORES TO INTEREST RATES

As Rates decrease average FICO score Is going up.

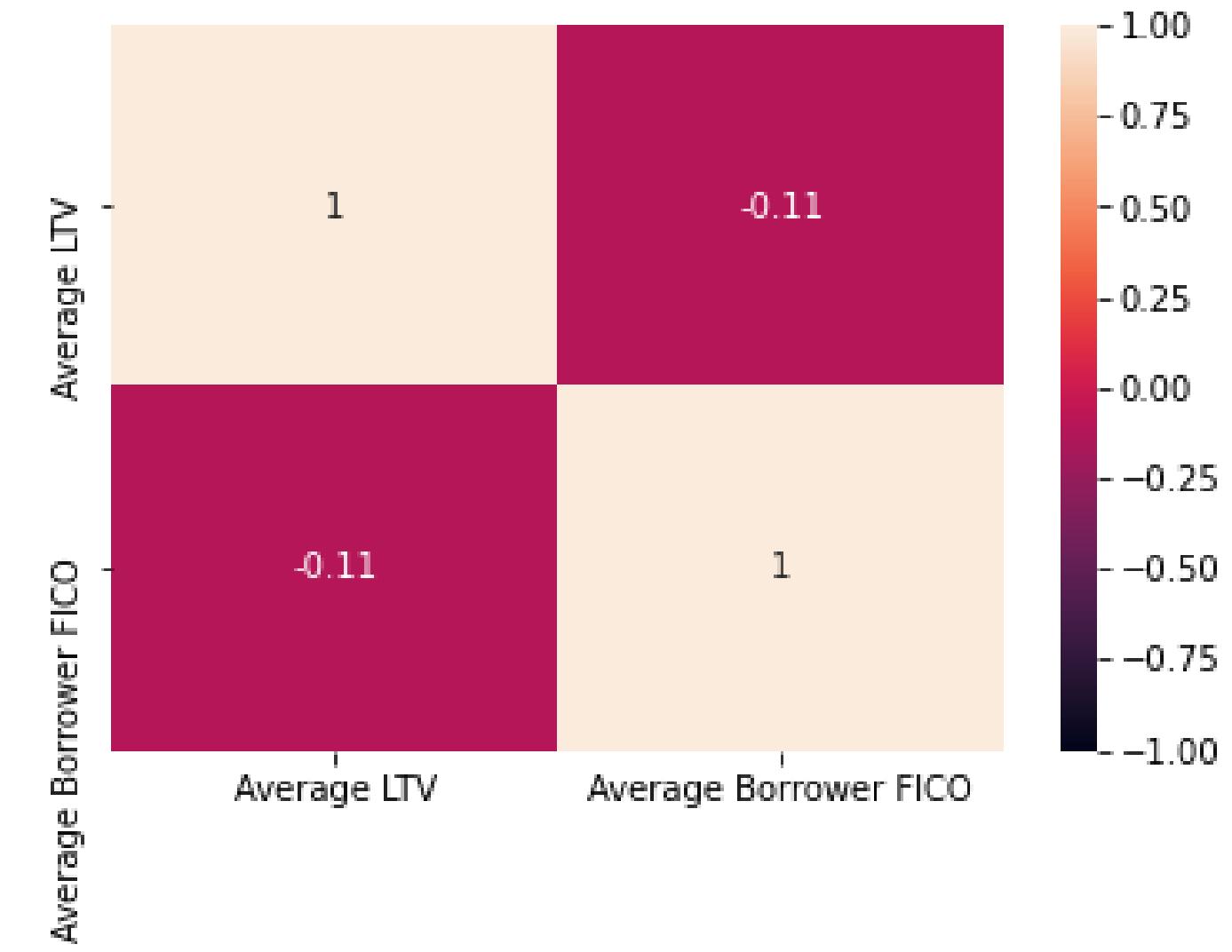
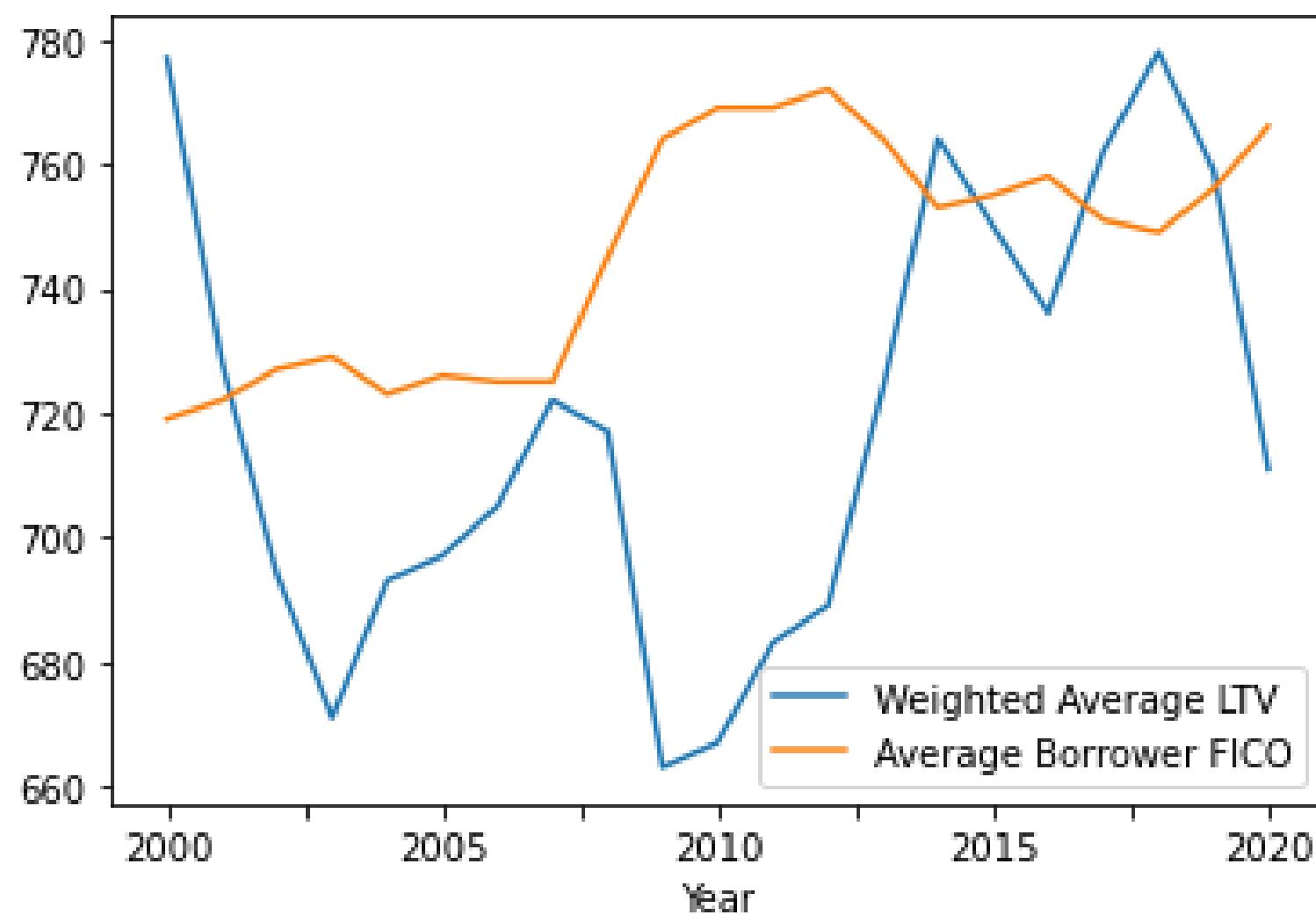


WEIGHTED AVERAGE FICO SCORE	1.000000
WEIGHTED NATIONAL AVERAGE 30 YEAR INTEREST RATE	-0.863102
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WEIGHTED AVERAGE FICO SCORE	1.000000

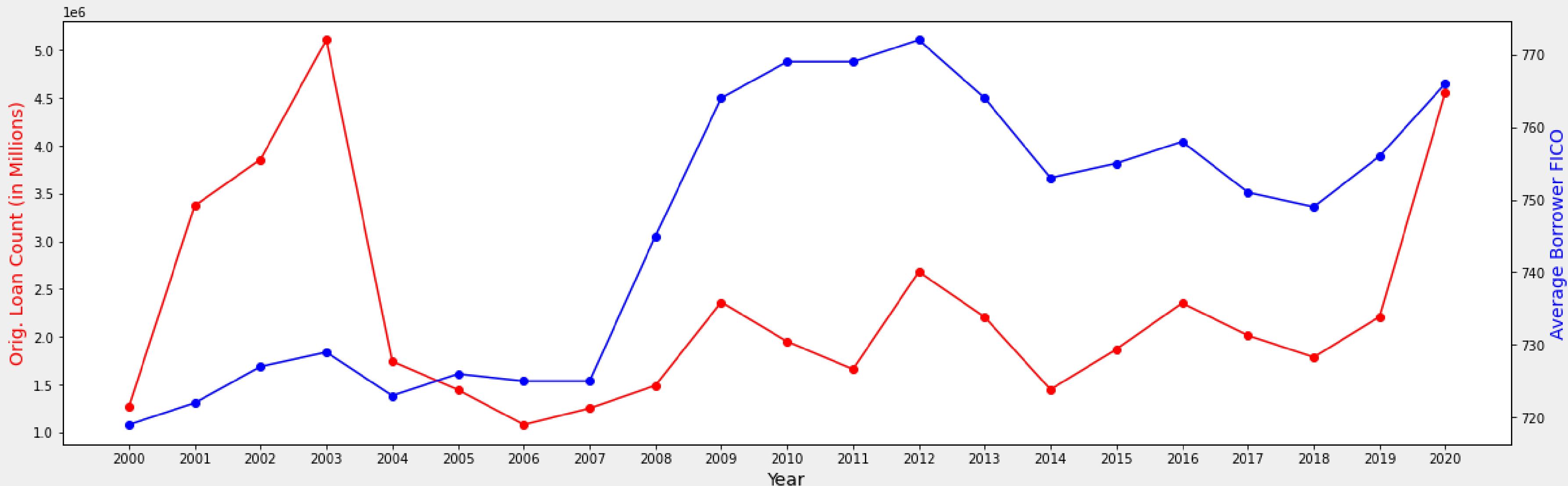


#3 FICO TO LTV

There Is a small correlation between Average FICO Score to LTV.



#13 THE AVERAGE FICO SCORE IN RELATIONSHIP TO THE AVERAGE LOAN BALANCE TO THE VALUE OF HOME

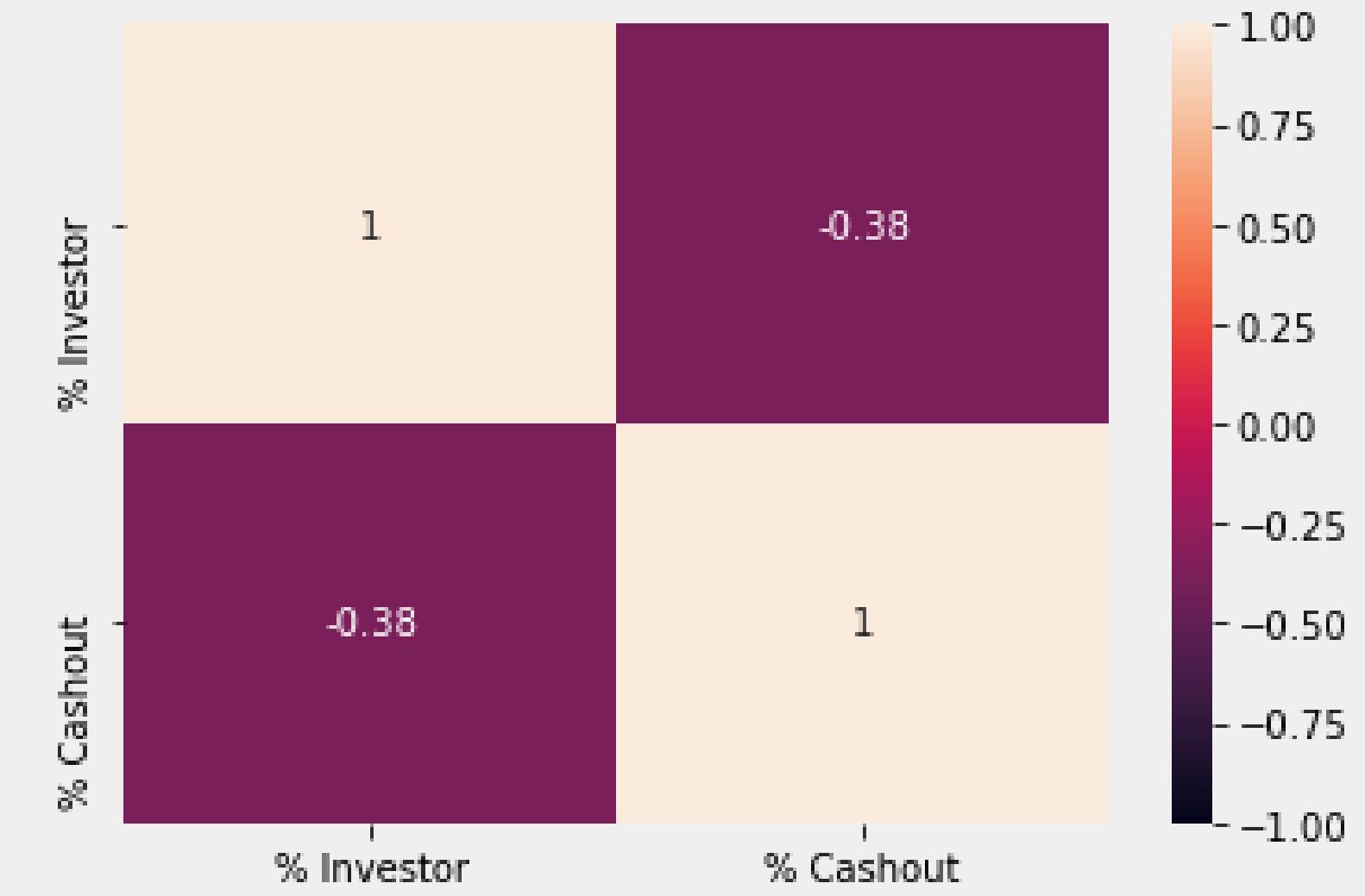
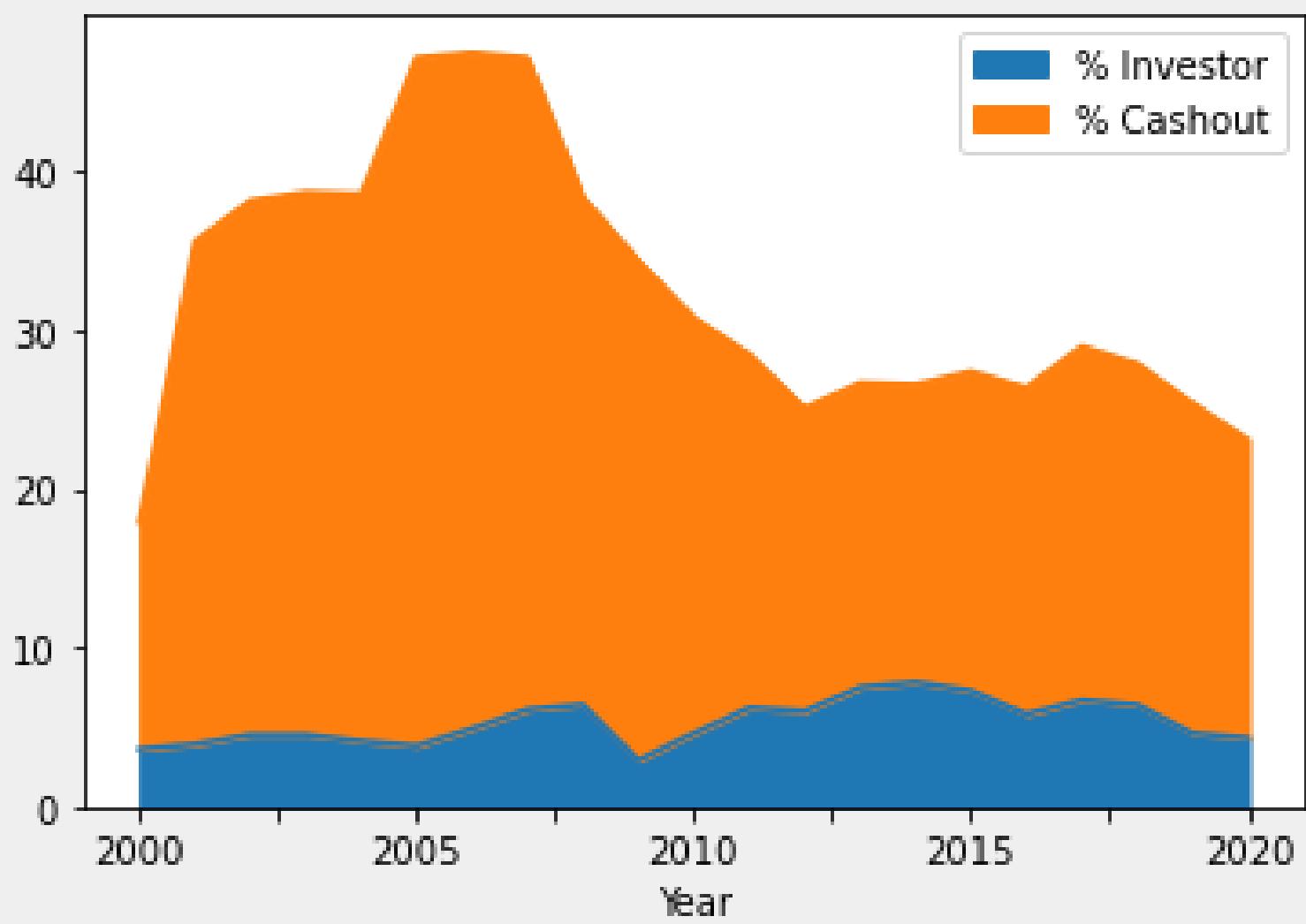


TREND 2

Percentage of Investors

Percentage of loans of home that are not owner occupied

#4 PERCENT OF INVESTORS VERSUS PERCENT OF LOANS THAT WERE CASH OUT REFINANCES

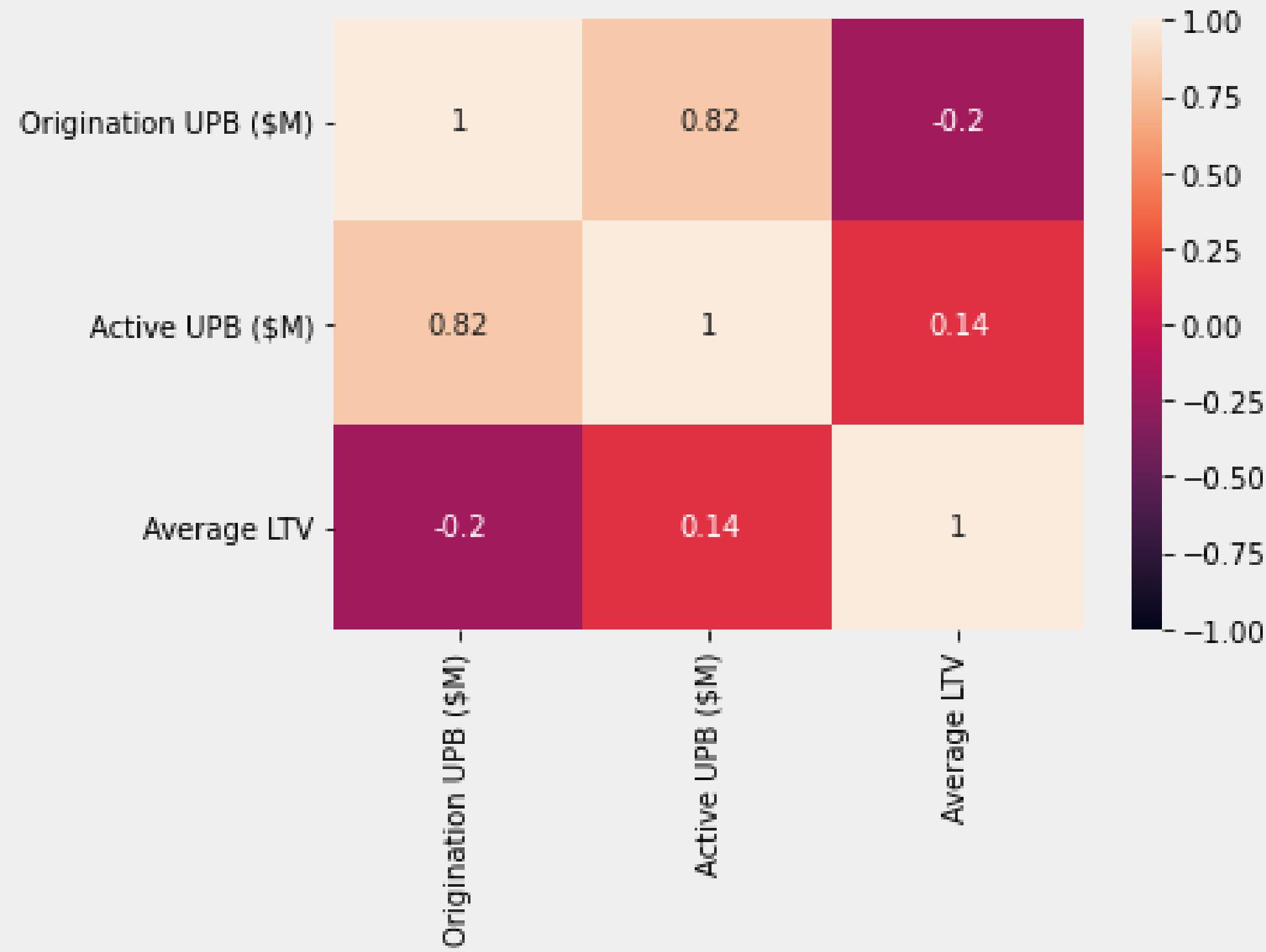


TREND 3

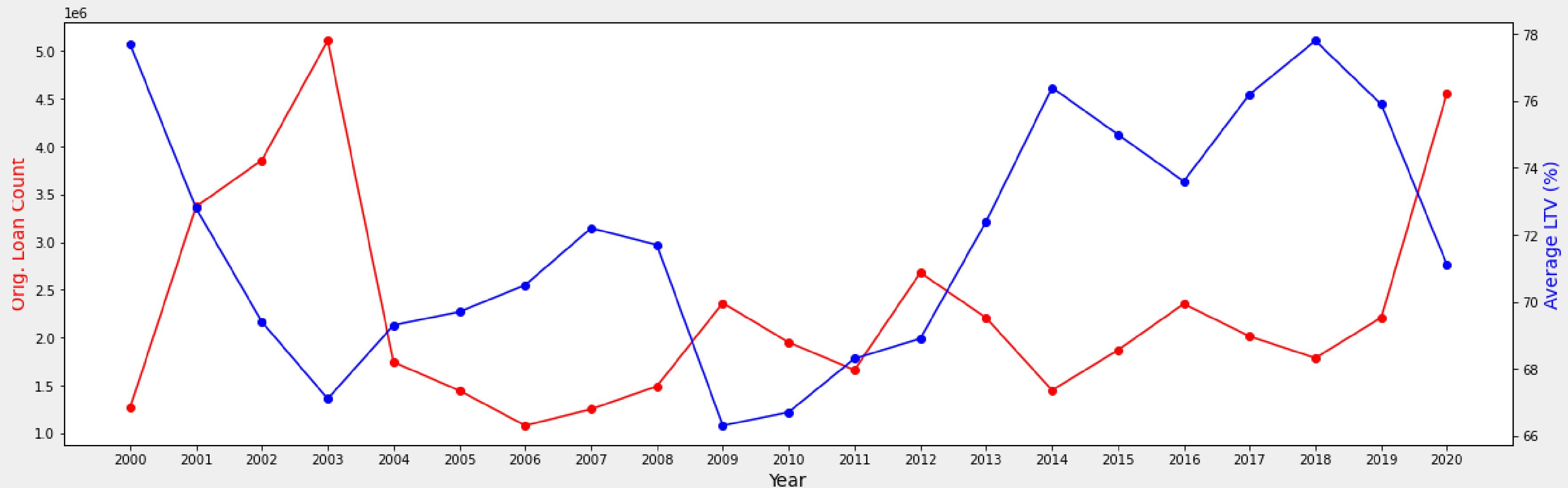
Average Loan to Value

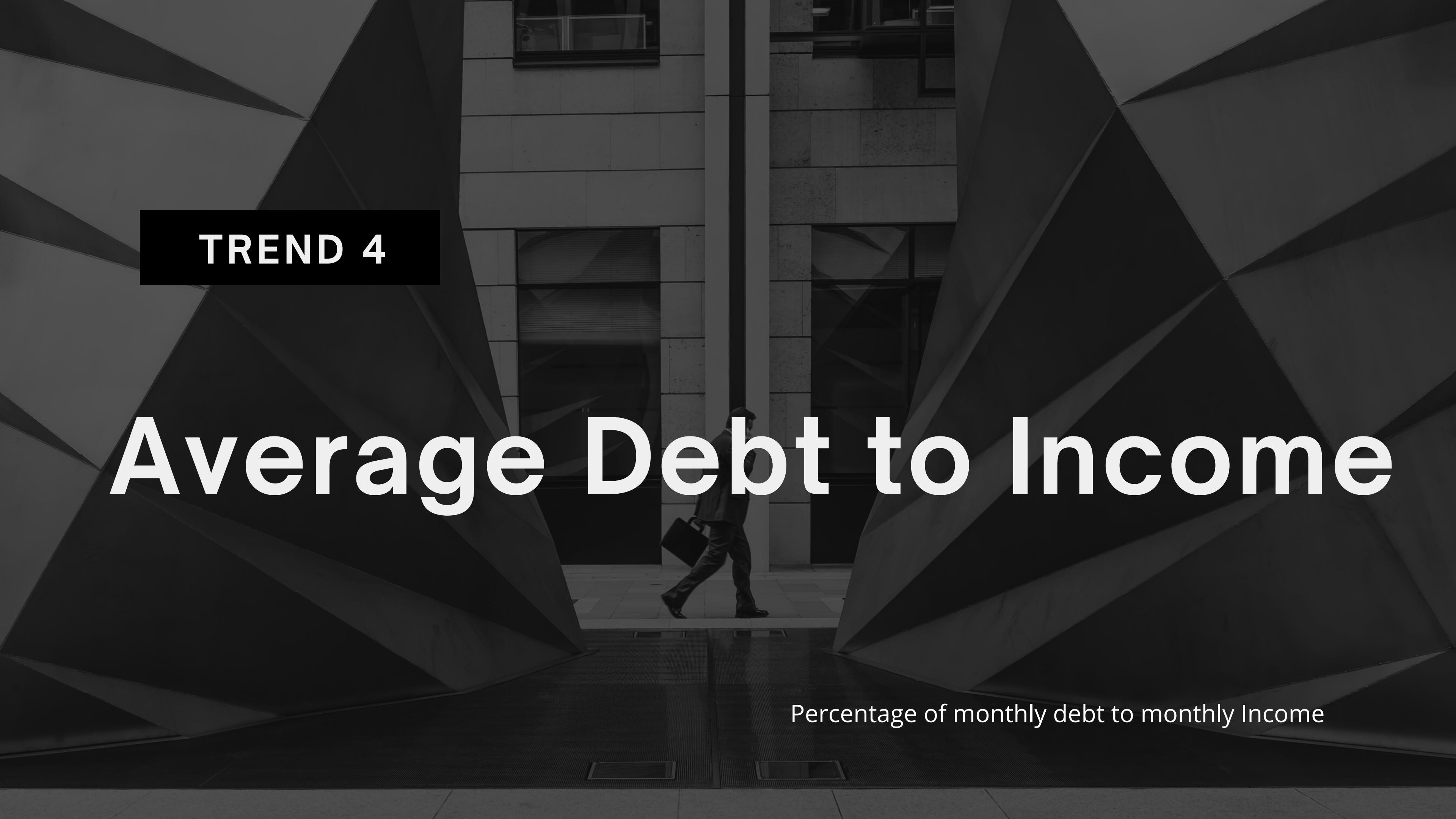
Loan amount as a percentage of the appraised value of the property

#6 OBSERVATION OF THE CHANGES IN THE UNPAID BALANCE TO THE CHANGE IN LOAN TO VALUE



#12 THE RELATIONSHIP BETWEEN THE AVERAGE LOAN TO VALUE AND THE VOLUME OF LOANS ORIGINATED.



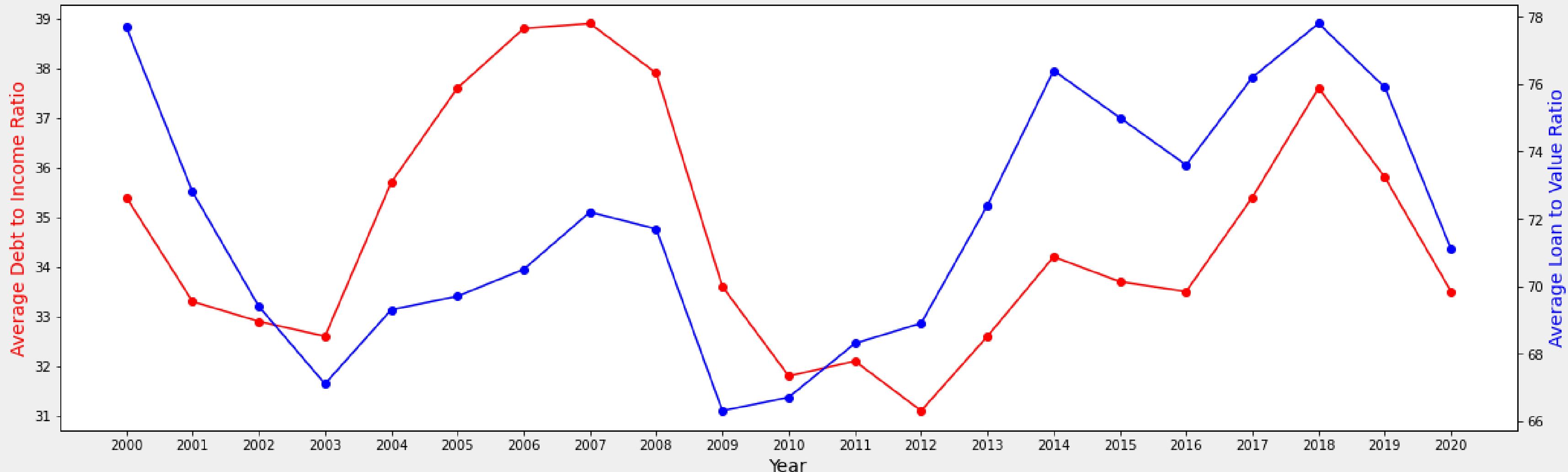


TREND 4

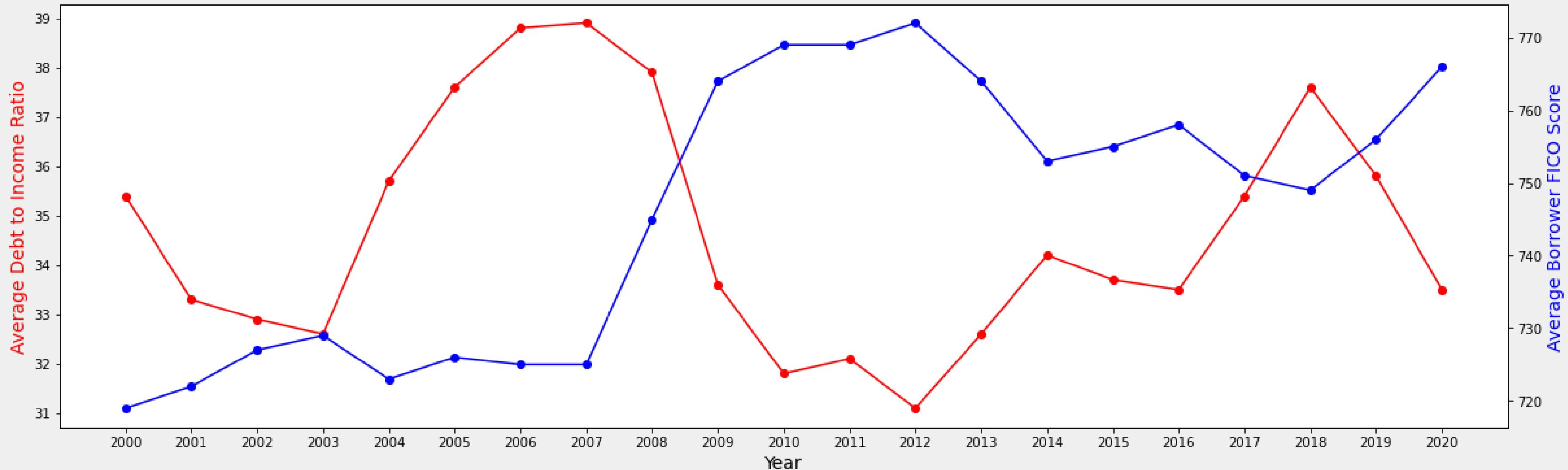
Average Debt to Income

Percentage of monthly debt to monthly Income

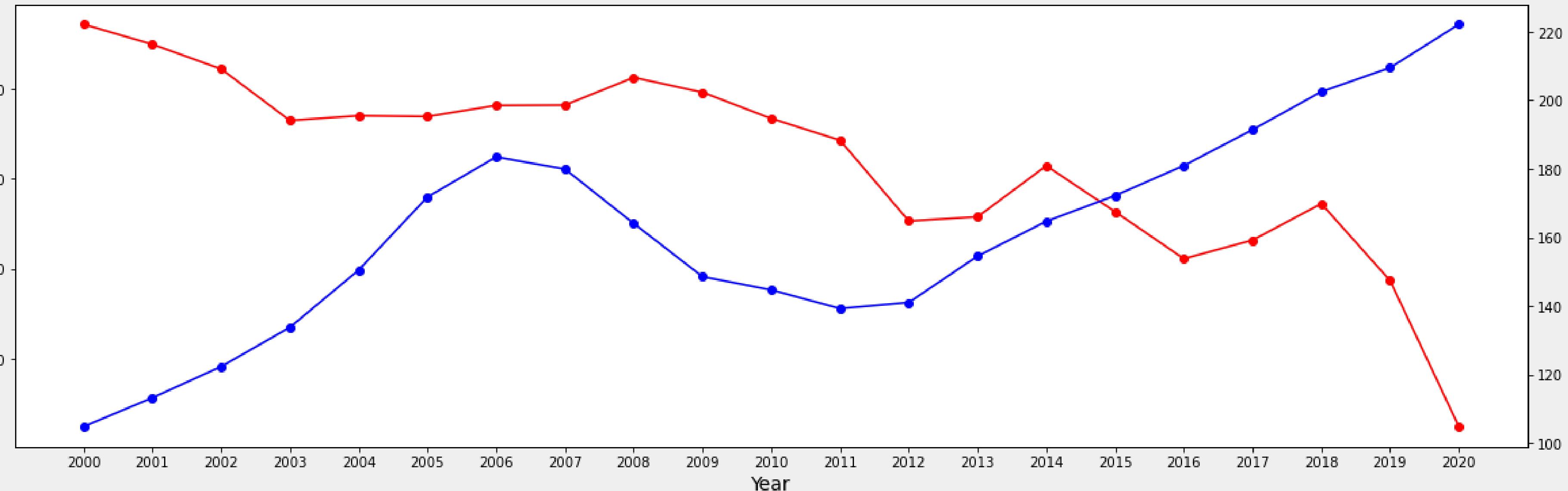
#14 OBSERVING BORROWERS DEBT TO INCOME COMPARED TO THE LOANS THEY TAKE OUT VERSUS THE VALUE OF THE PROPERTY



#15 OBSERVING THE AVERAGE DEBT TO INCOME RATIO AS COMPARED TO THEIR FICO SCORES



#11 PERCENTAGE OF HOMEOWNERS WHO PAY OFF THEIR LOANS AS THE PRICE OF THIER HOME INCREASE

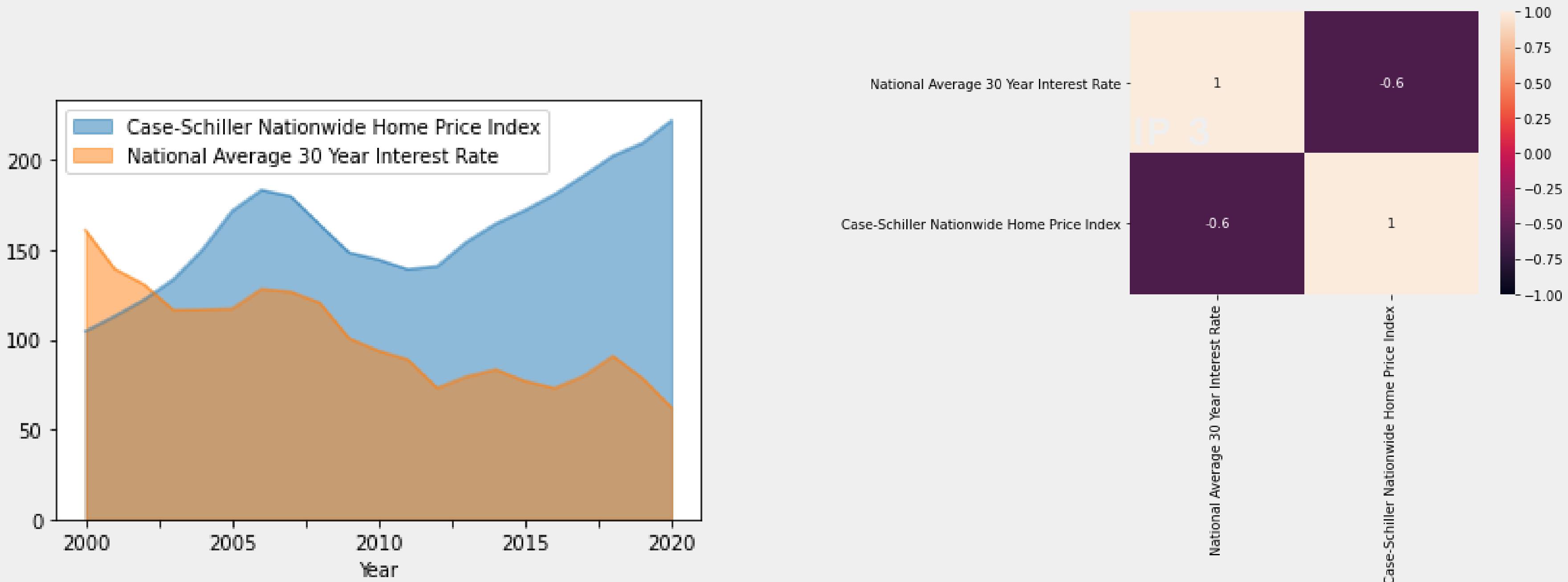


TREND 5

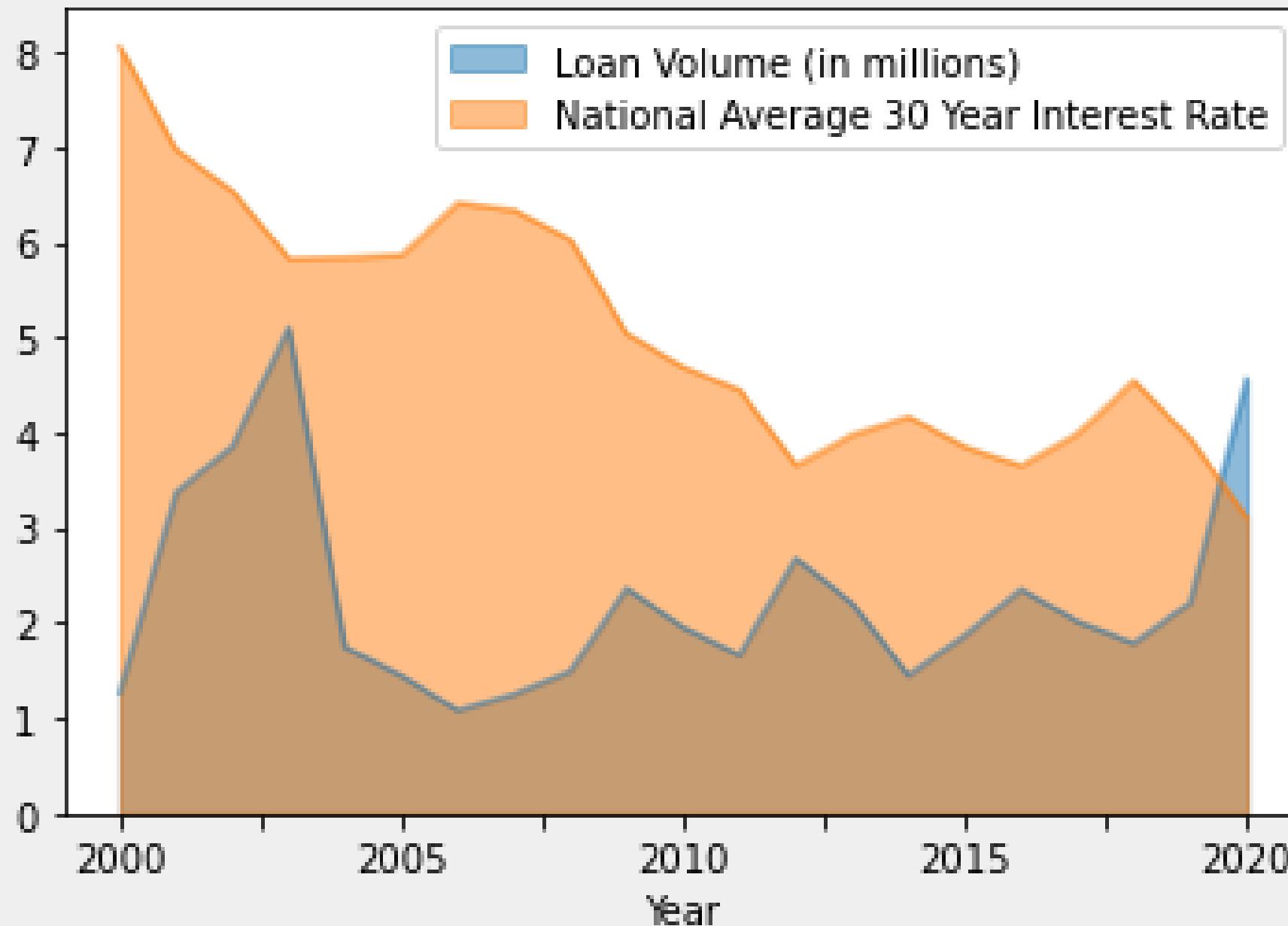
Interest Rate Changes

The average Interest rate charged for home loans

#5 INTEREST RATE TO HOME PRICES

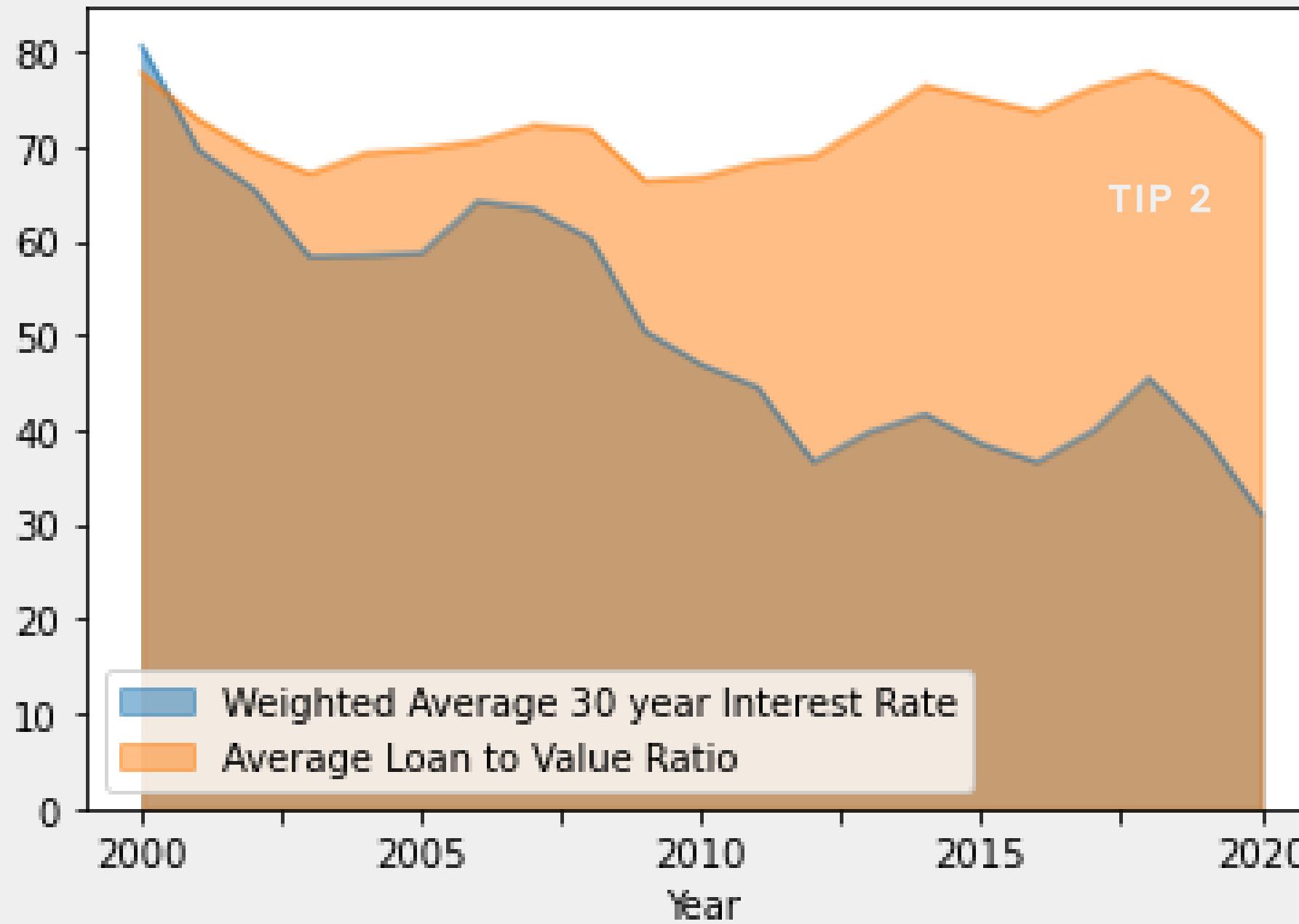


#1 TOTAL LOAN VOLUME TO INTEREST RATE



LOAN VOLUME (IN MILLIONS) \	NATIONAL AVERAGE 30 YEAR INTEREST RATE
LOAN VOLUME (IN MILLIONS)	NATIONAL AVERAGE 30 YEAR INTEREST RATE
1.000000	-0.134751
-0.134751	1.000000

#10 PERCENTAGE OF LOAN PAID BEFORE THE END OF THE LOAN TERM AS INTEREST RATES CHANGE



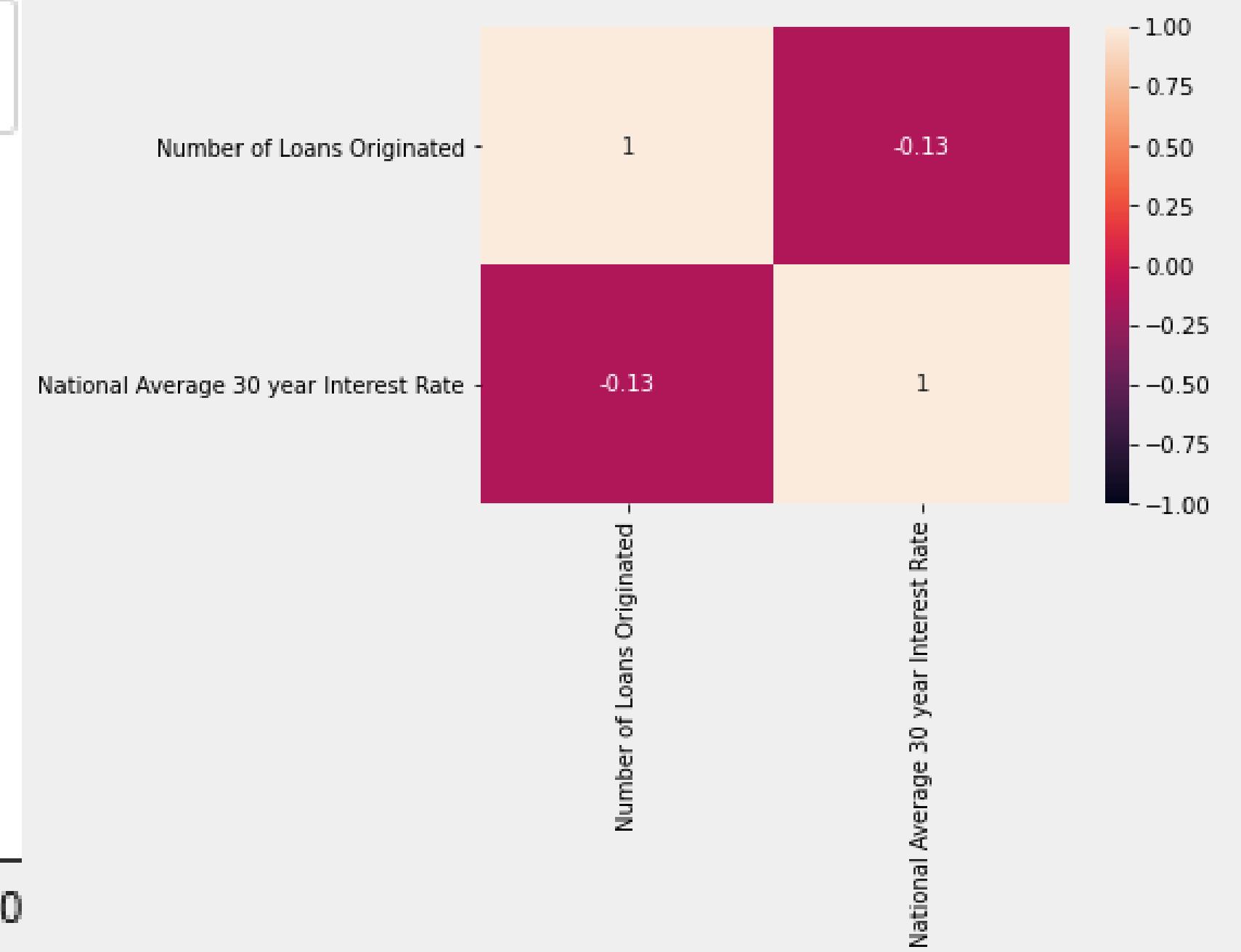
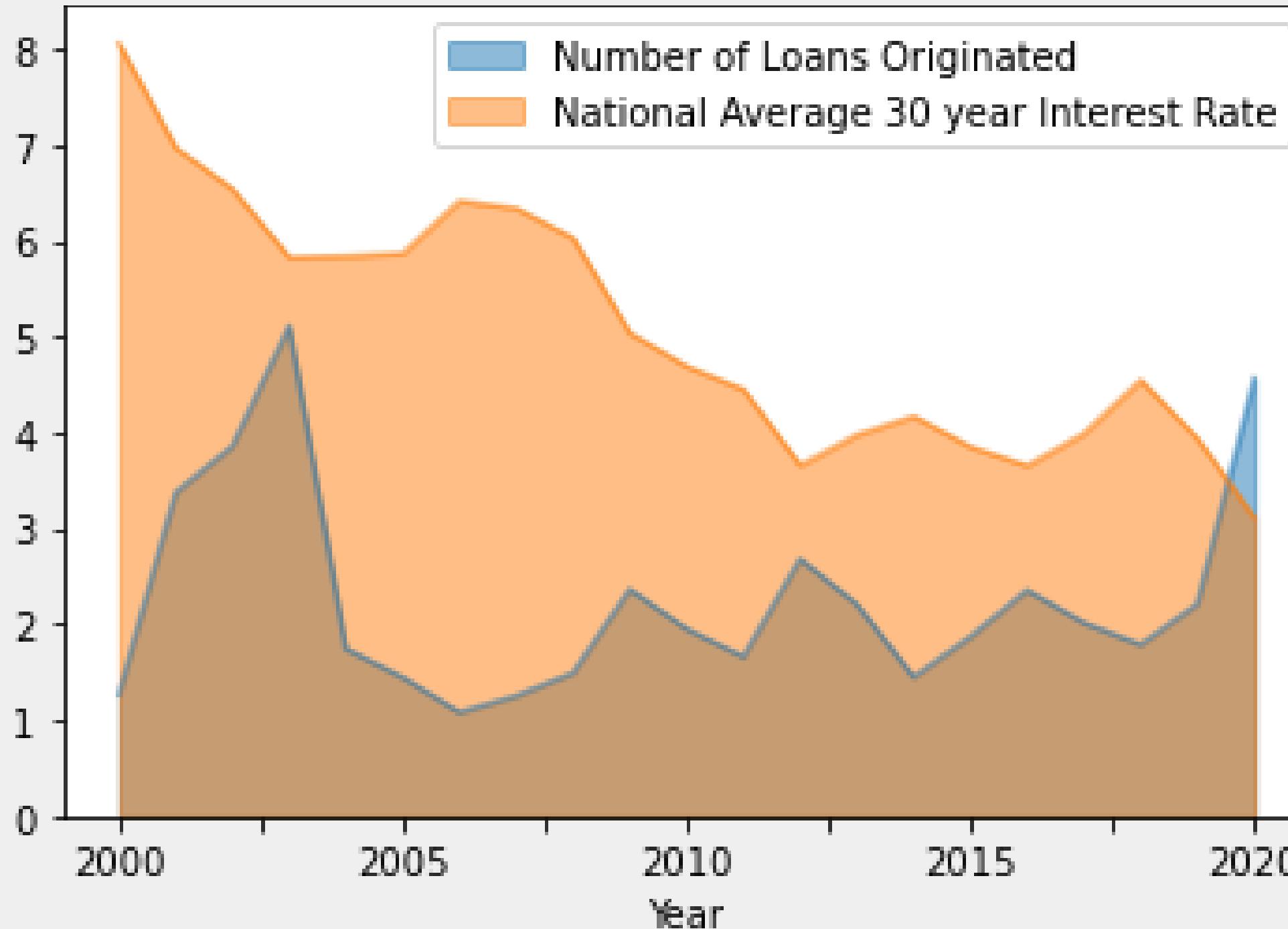


TREND 8

Number of New Loans

Gross number of new loans

#9 INTEREST RATE TO NUMBER OF LOANS





Period Correlatoins

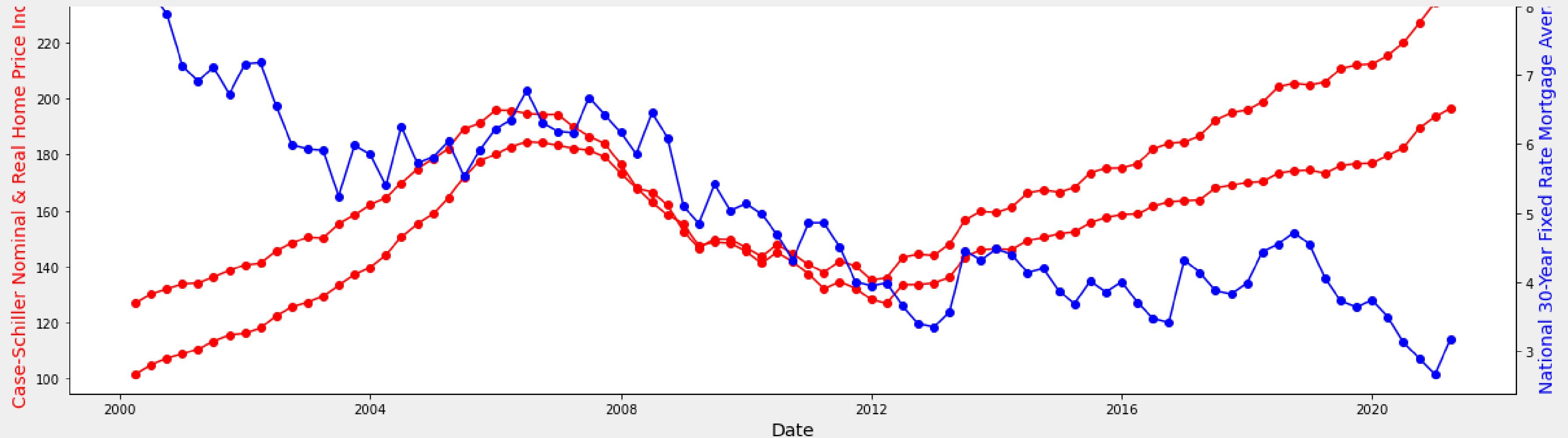
Basic Observations



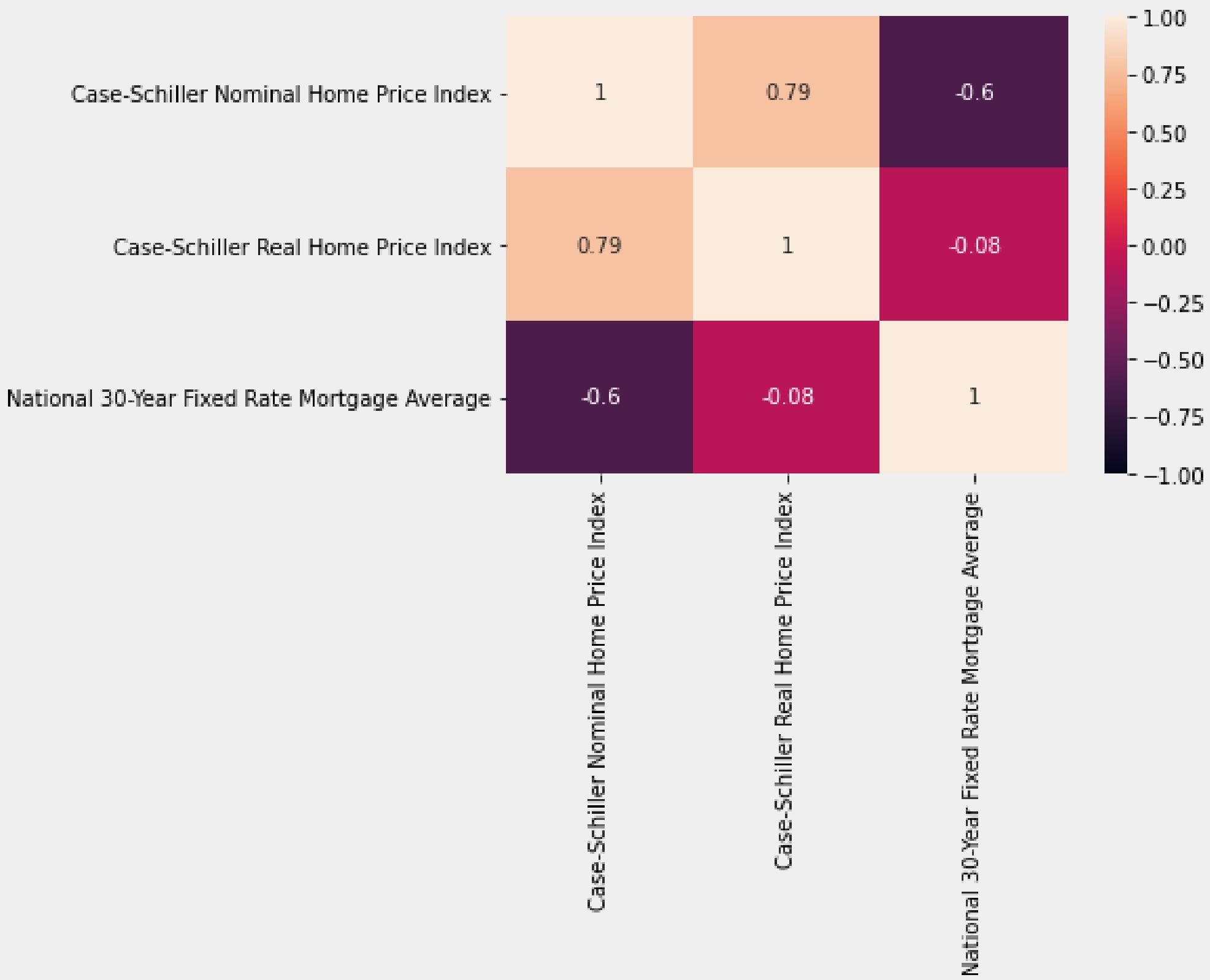
Monte Carlo

Monte Carlo simulations
allow us to simulate
cumulative returns over
a set period.

QUANDL API



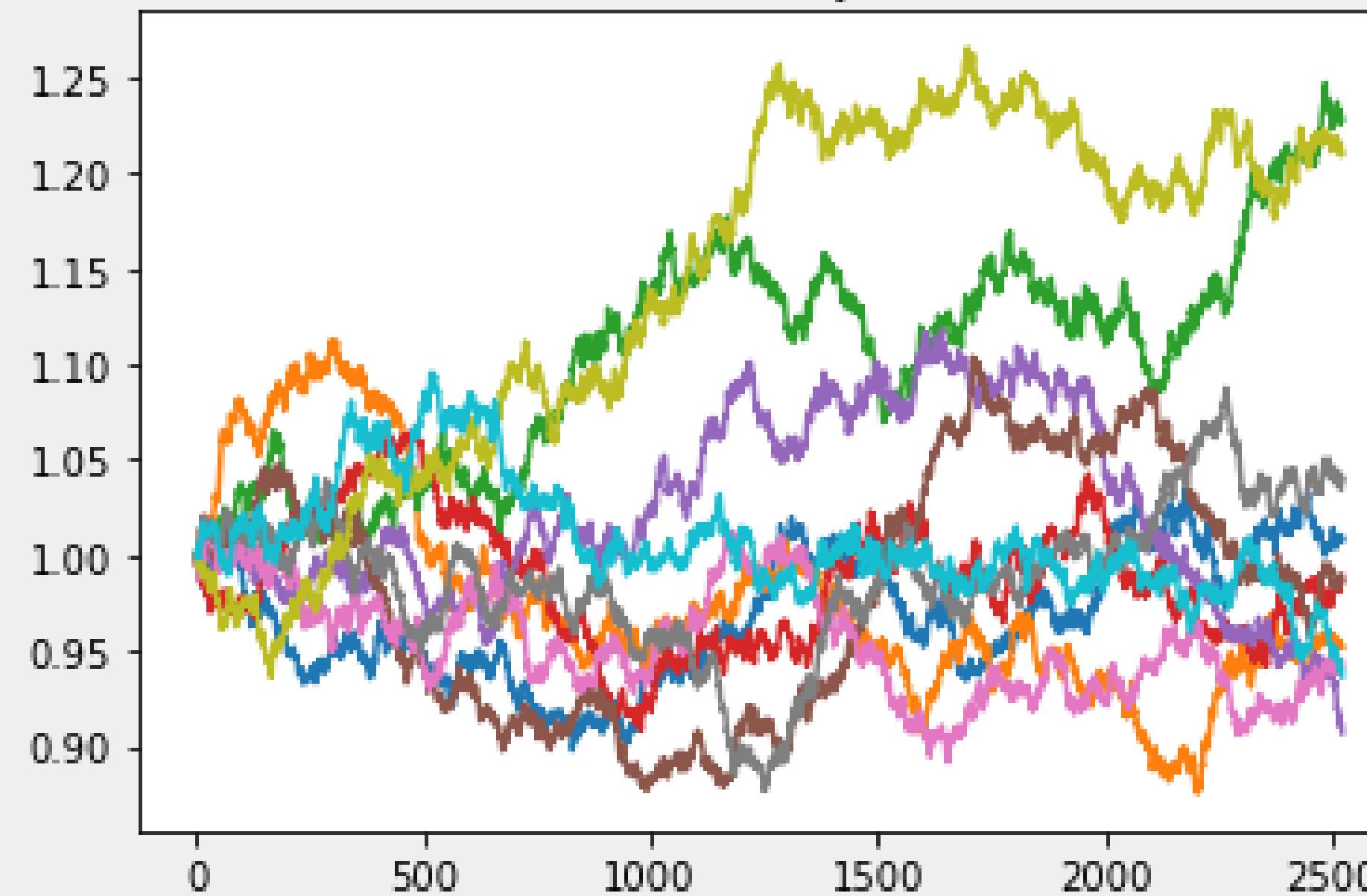
MONTE CARLO 1



MONTE CARLO 2

Simulation Test

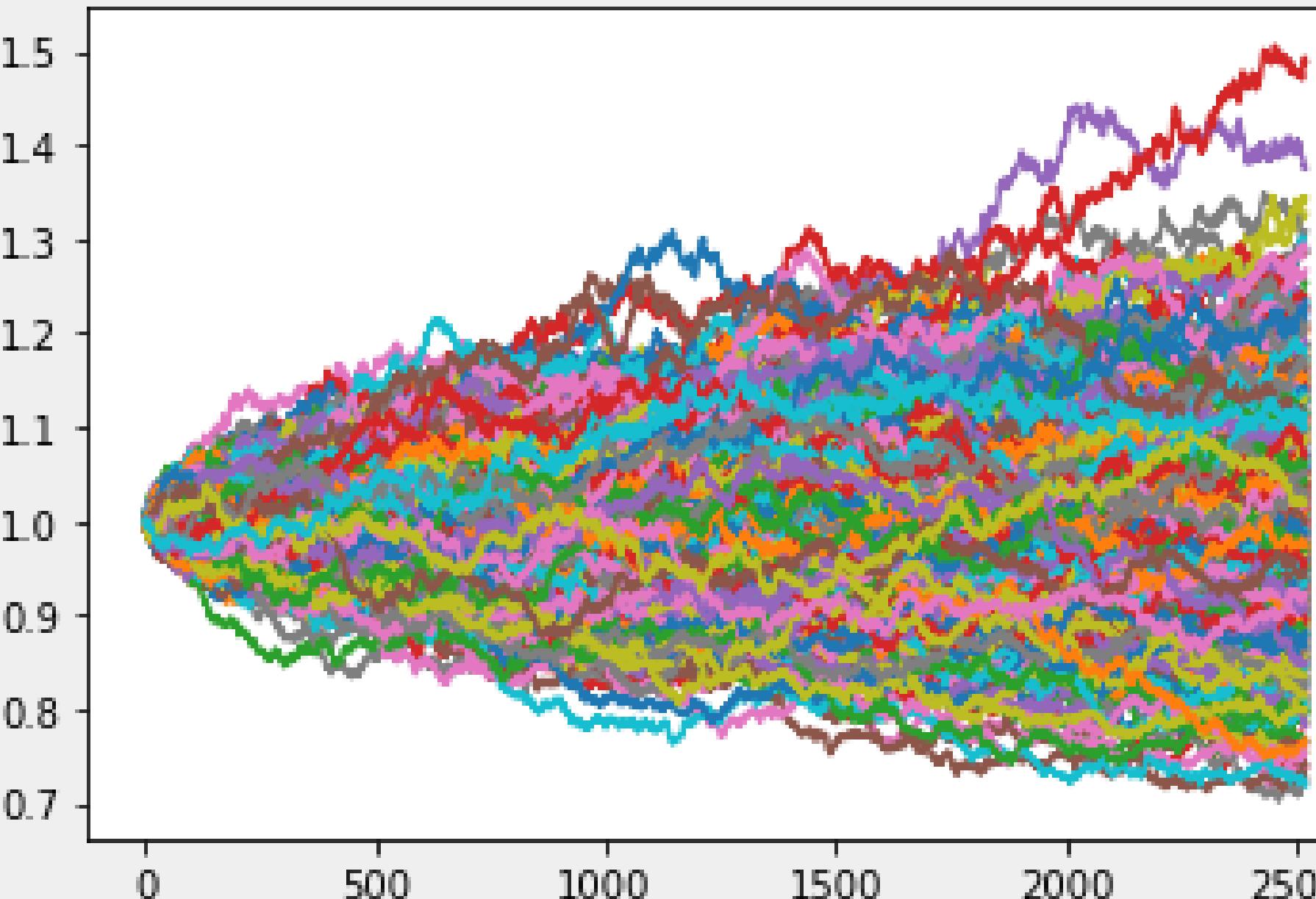
10 Simulations of Cumulative Portfolio Return Trajectories Over the Next 2520 Trading Days.



MONTE CARLO 2

We created a portfolio of the four largest mortgage backed securities ETFs and simulated their returns to show this trend

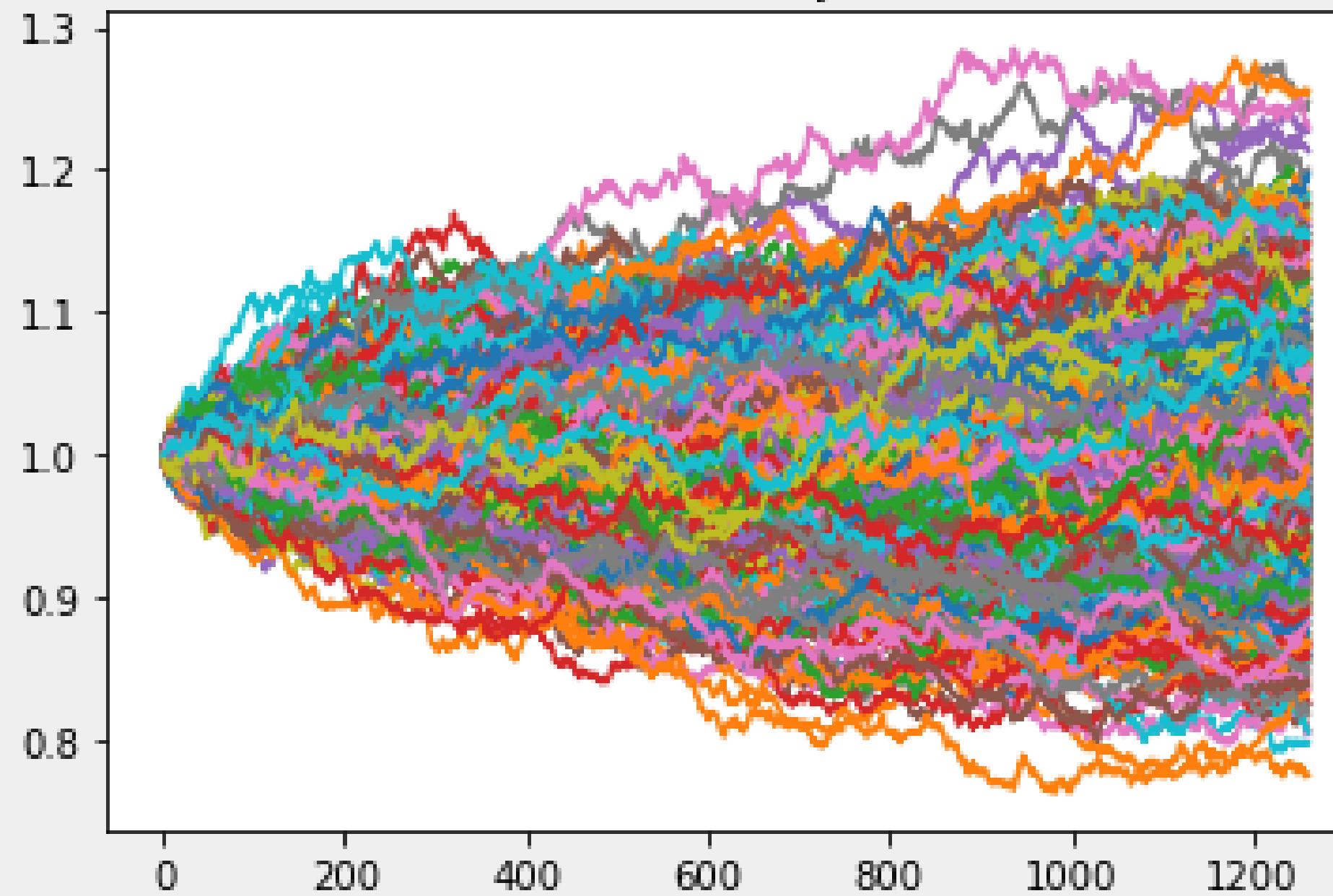
500 Simulations of Cumulative Portfolio Return Trajectories Over the Next 2520 Trading Days.



MONTE CARLO 3

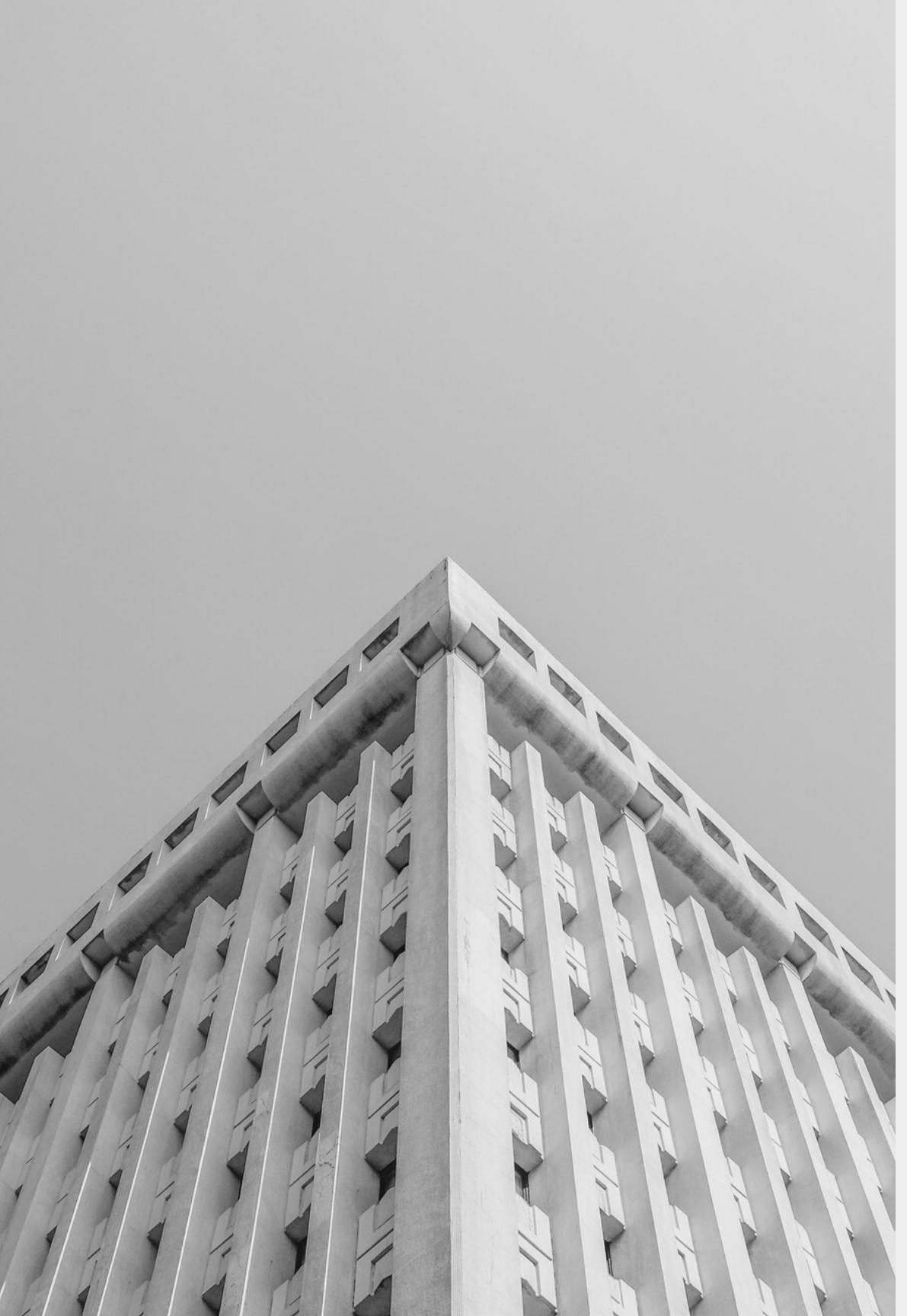
This visual shows stagnating returns for mortgage backed securities, which we argue is due to low interest rates

500 Simulations of Cumulative Portfolio Return Trajectories Over the Next 1260 Trading Days.



Libraries Used:

**Pandas, Matplotlib, Seaborn, Plotly
Express & Alpaca Trade API**

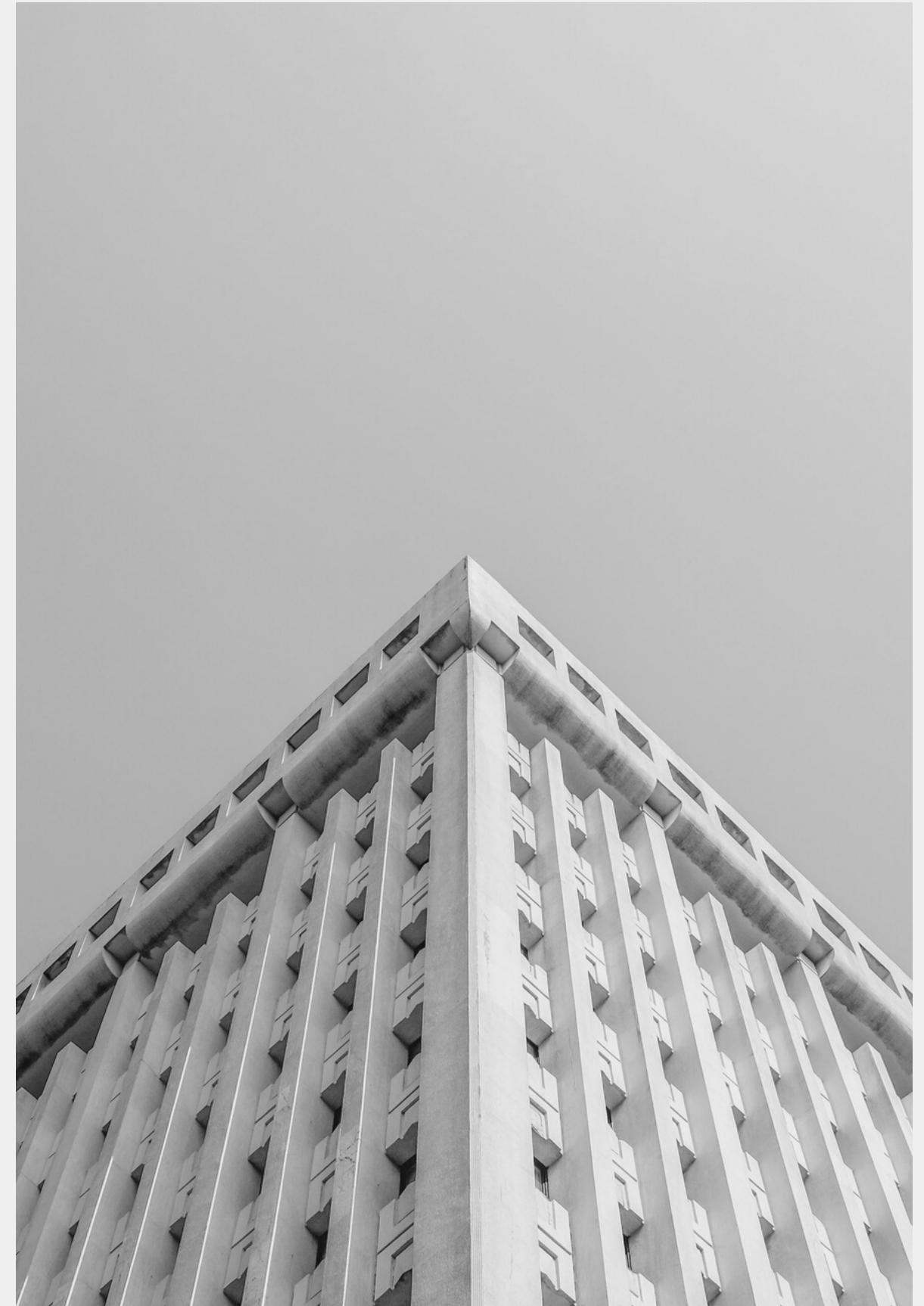


Summary

- Consistent trends that led up to the 2008 correction
- Need to change criteria to mitigate risk
- Update revenue estimates with anticipated market changes

Policy Recommendations

- Decrease loan to value limits In anticipation of decreases asset prices
- Adjust debt to income limits in anticipation of a housing market correction.
- Limit relationship with real estate investors to mitigate adverse exposure speculation based losses
- Limit origination of cash out refinances in anticipation of correction which could leave borrowers underwater.



Questions

